

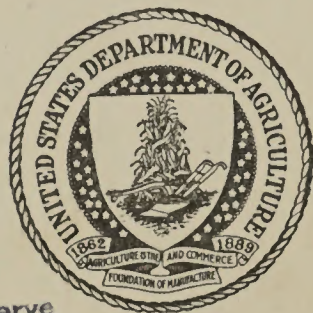
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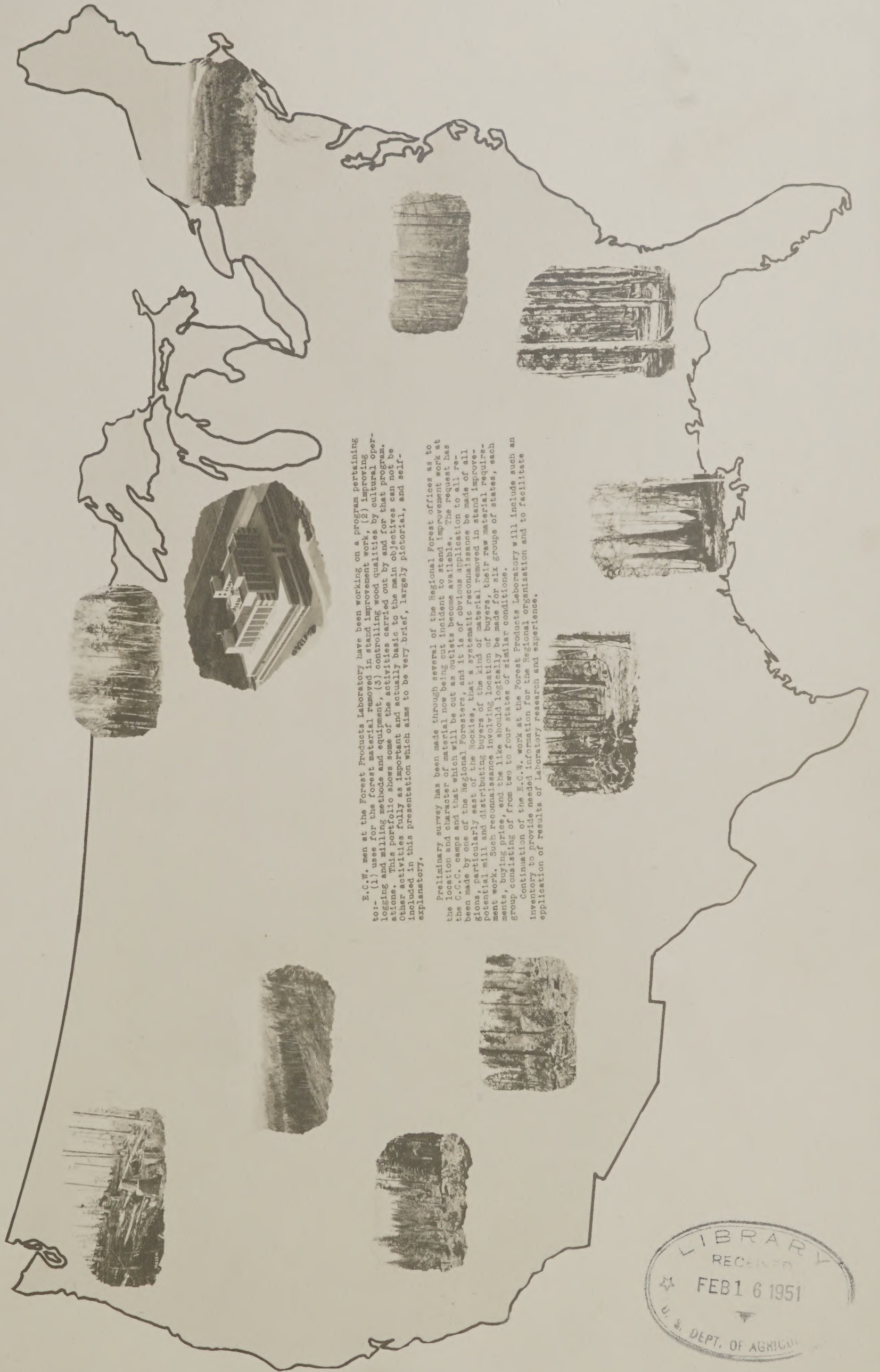
³ SOME CURRENT
E.C.W. RESEARCH ACTIVITIES
ON
UTILIZATION PHASES OF FOREST STAND IMPROVEMENT
AT THE
FOREST PRODUCTS LABORATORY.
FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE
MARCH 15, 1935
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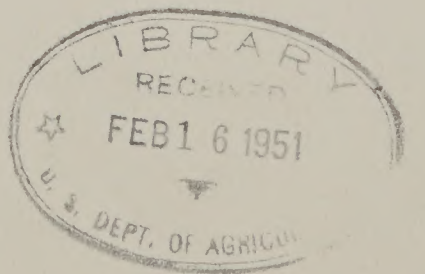
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E.C.W. men at the Forest Products Laboratory have been working on a program pertaining to: (1) use for the forest material removed in stand improvement work, (2) improving logging and milling methods and equipment, (3) controlling wood qualities by cultural operations. This portfolio shows some of the activities carried out by and for that program. Other activities fully as important and actually basic to the main objectives can not be included in this presentation which aims to be very brief, largely pictorial, and self-explanatory.

Preliminary survey has been made through several of the Regional Forest offices as to the location and character of material now being cut incident to stand improvement work at the C.C.C. camps and that which will be cut as outlets become available. The request has been made by one of the Regional Foresters, and it is of obvious application to all regions, particularly east of the Rockies, that a systematic reconnaissance be made of all potential mill and distributing buyers of the kind of material removed in stand improvement work. Such reconnaissance involving location of buyers, their raw material requirements, buying price, and the like should logically be made for six groups of states, each group consisting of from two to four states of similar conditions.

Continuation of the E.C.W. work at the Forest Products Laboratory will include such an inventory to provide needed information for the Regional organization and to facilitate application of results of laboratory research and experience.



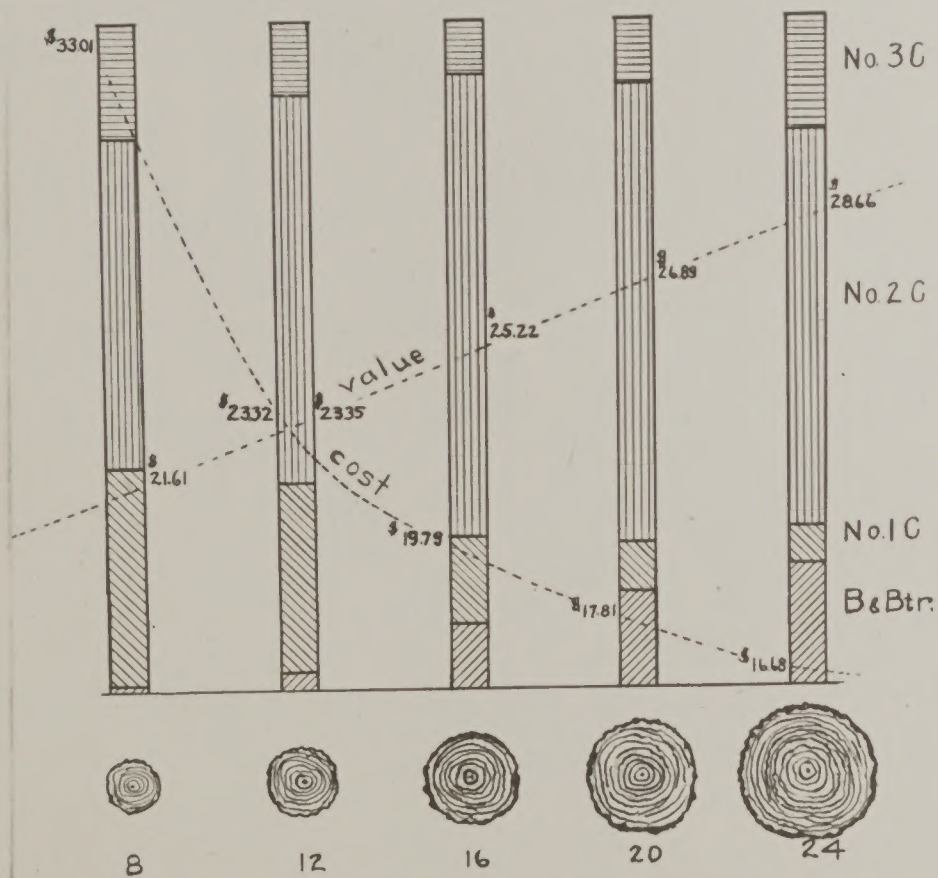
SELECTIVE LOGGING



Clear Cutting



Selective Cutting

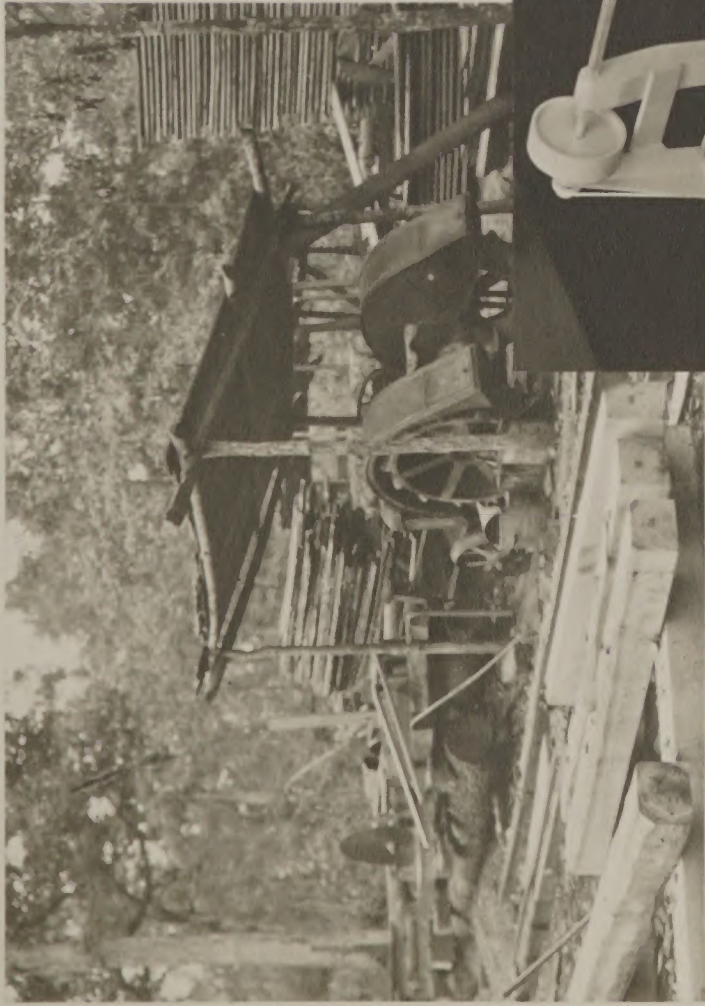


GRADE YIELDS AND PRODUCTION COSTS BY TREE SIZES

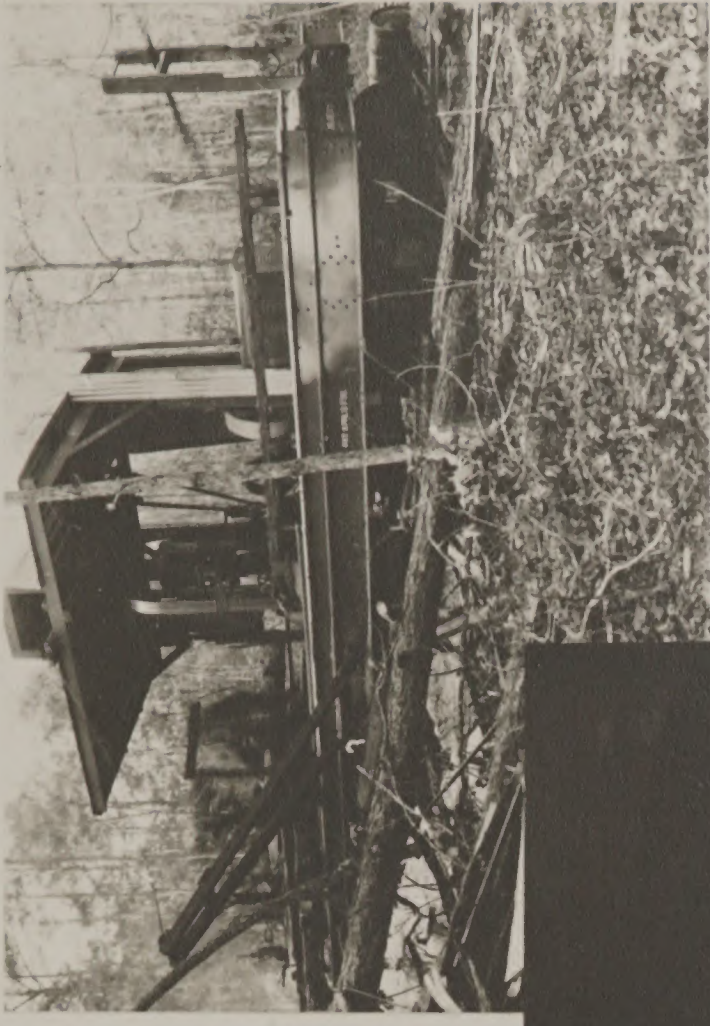
Current returns per acre from these two operations are approximately equal. Clear cutting, however, has left the land in poor re-stocking condition to be a burden on ownership for 60 years or more, until a new stand can be grown from the ground up. The selectively cut stand will yield successive crops on a 15 to 20-year cutting cycle.

The Forest Products Laboratory has from the first been intimately associated with the development of selective logging standards. In painstaking investigations thousands of trees have been followed from the stump to finished lumber. Segregating costs by size of trees and determining profits by quality of yield, the Laboratory's studies have established economic cutting limits for stands of many types. Selective logging offers promise of successful adoption in commercial forestry and gives a reasonable basis for the Government's minimum cutting requirements under Article X of the lumber code. Selective logging studies on an increased scale have been carried out as a part of E.C.W. work and more are needed because of the importance of the findings to forest ownership and management throughout the country.

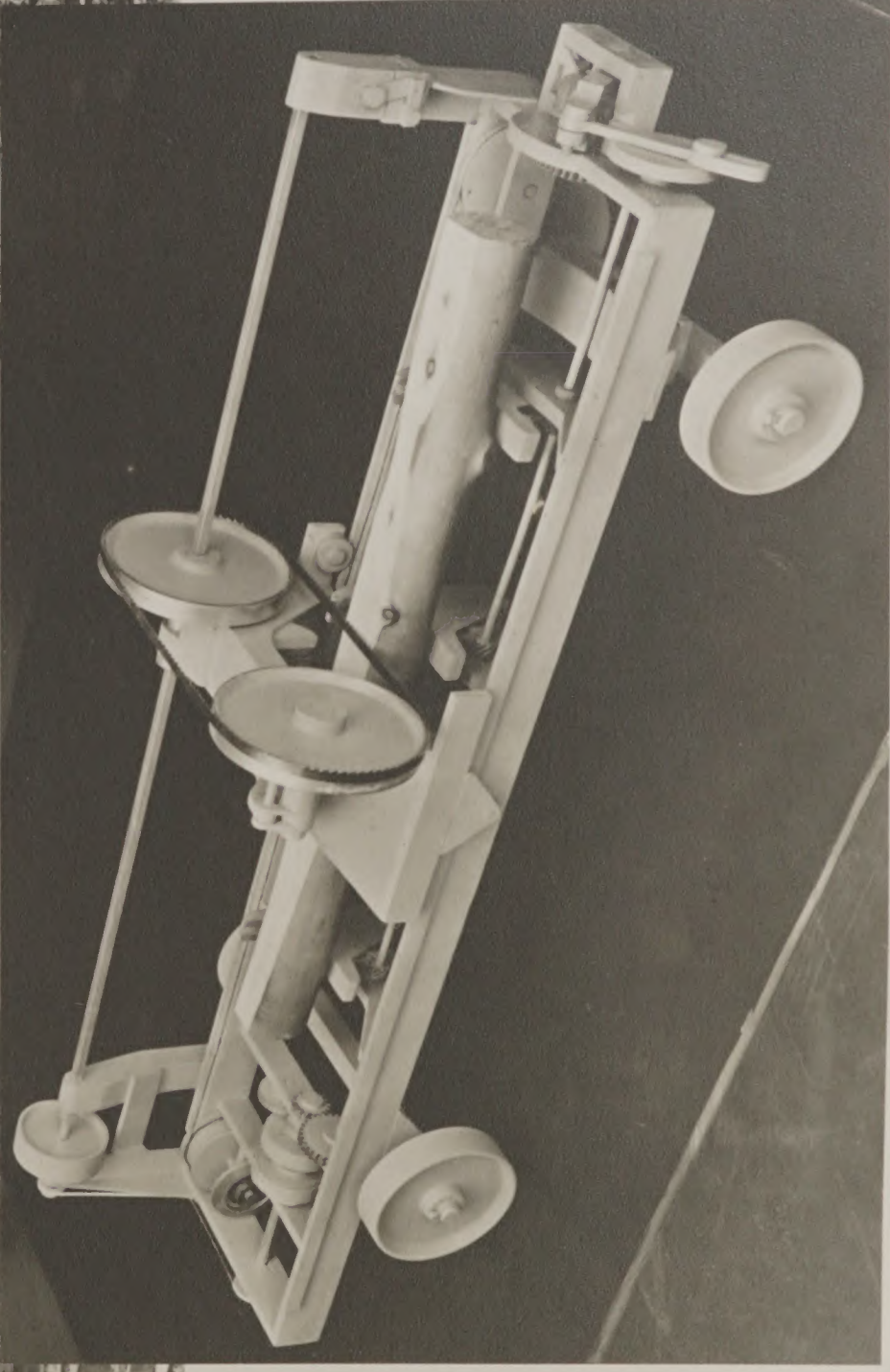
SMALL SAWMILL IMPROVEMENT



One-fourth to one-third of the lumber of the country is cut by 30,000 small mills. The average portable outfit uses a wide-kerf circular saw, is crude in operation, wastes a large part of the log, and turns out a low-value product. The result is damage to the reputation of lumber and, in thousands of cases, actual impoverishment of the operator.



The best commercial type of portable mill, shown here, uses the thin and efficient bandsaw and a mechanical layout that insures accurate and economical work. Its size and weight, however, require railway mounting. This fact and its initial cost put it far outside the field of the average small operator.




Forest Products Laboratory engineers with the aid of E.C.W. specialists are designing a portable mill with improved mechanism in which the bandsaw moves into the log instead of the log moving to the saw, thereby reducing the size, weight, and cost of the outfit to about half that of the best now available. Putting an efficient mill within reach of the small operator means better production and a sound basis of employment in many communities.



POWER PRUNING

Increasing the prospects of a profitable harvest of clear lumber by high pruning of under limbs. Development by the Forest Products Laboratory E.C.W. engineers of a light power-driven pole saw promises to make high pruning a more practical part of forest management, affording additional woods employment and more than repaying its cost in the shorter rotation required to produce high-quality lumber. It will be decades before the stand in the lower picture, if left to "natural pruning," will begin to put on wood of clear quality. Power in lieu of hand sawing bids fair to greatly increase the acreage that can be pruned and particularly the height.





ROSIN CUPS

Turpentine operators in Georgia, Florida, and Alabama are using 100 million rosin cups of aluminum, sheet iron, or clay, while wood goes to waste and millions of acres of the stand badly need improvement cuttings. Under the E.C.W. program Forest Products Laboratory research on antishrink wood treatments and portable shaping machinery offers to operators the prospect of obtaining serviceable cups of wood by use of material from improvement cuttings and local labor to the advantage of their stands, their employees, and their net income.





FENCING

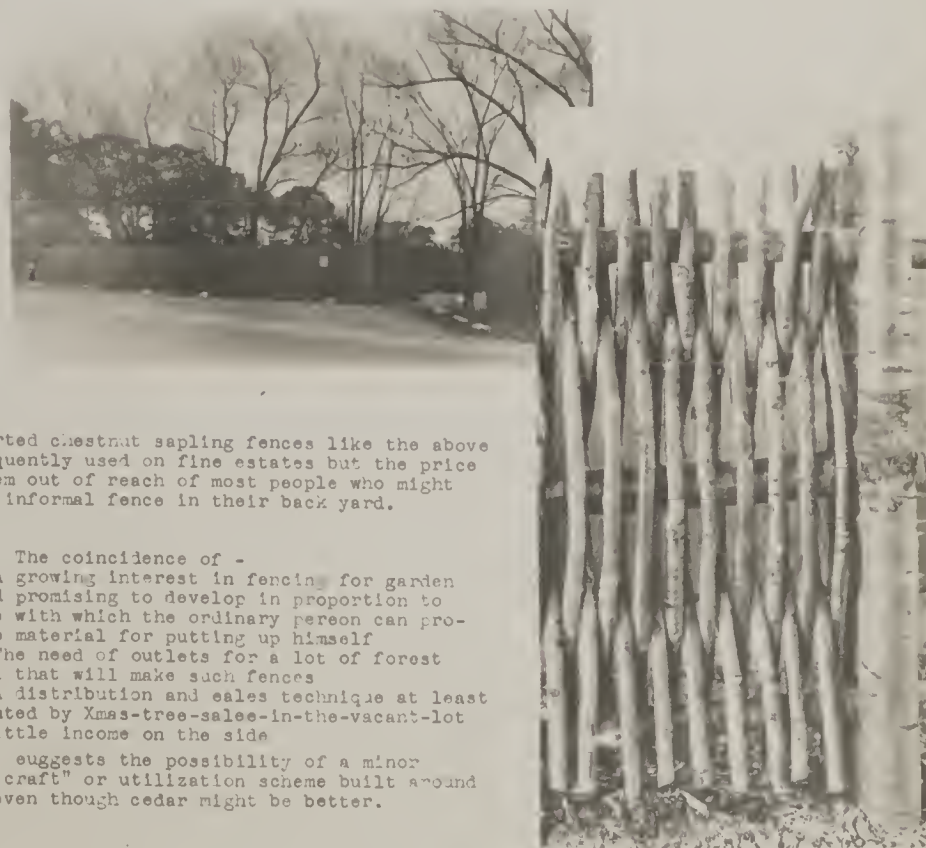
Much of the material that should be reserved for fencing is of the size and form for fencing. Although it has the necessary strength and nail-holding properties, it does not have the natural resistance to decay unless given preservative treatment. Care and demonstration of how such material can be made suitable for fencing are important to stand improvement activities.



E.C.W. work on fencing at the Forest Products Laboratory shows that green aspen posts do not permit sufficient penetration of creosote to be effective. By following proper treating schedules, however, good penetration is obtained both by pressure treatment (Laboratory cylinder, center) and also by the open-tank, hot and cold bath process (field equipment, right).



The Laboratory's assistance is being made available in connection with the fencing of the shelter belt. Large potential outlets for material from improvement cuttings exist there and also for snow fencing.



Imported chestnut sapling fences like the above are frequently used on fine estates but the price puts them out of reach of most people who might like an informal fence in their back yard.

The coincidence of -
 (1) A growing interest in fencing for garden and yard promising to develop in proportion to the ease with which the ordinary person can procure the material for putting up himself
 (2) The need of outlets for a lot of forest material that will make such fences
 (3) A distribution and sales technique at least preceded by Xmas-tree-sales-in-the-vacant-lot for a little income on the side
 suggests the possibility of a minor "forest craft" or utilization scheme built around aspen, even though cedar might be better.



LOG CABIN

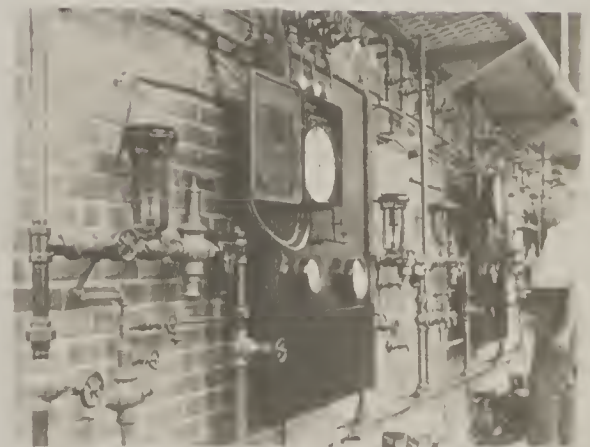
Need for adequate farm buildings is widely recognized in close proximity to oversupply of logs suitable for lumber which are removed for improvement of the stand. This condition is typical of the newer, unsettled portions of the Lake States and to some extent elsewhere. Suggestions have been made that a joint effort of lumber and forestry workers get together to deal with such conditions.

E.C.W. work at the Forest Products Laboratory involved cooperation with Wisconsin rehabilitation agencies in testing a new type of log construction using aspen in half-log, vertical, over-lap, and insulated joint construction (left) in lieu of conventional horizontal wall corner construction (above) which is expensive and needs frequent repair.



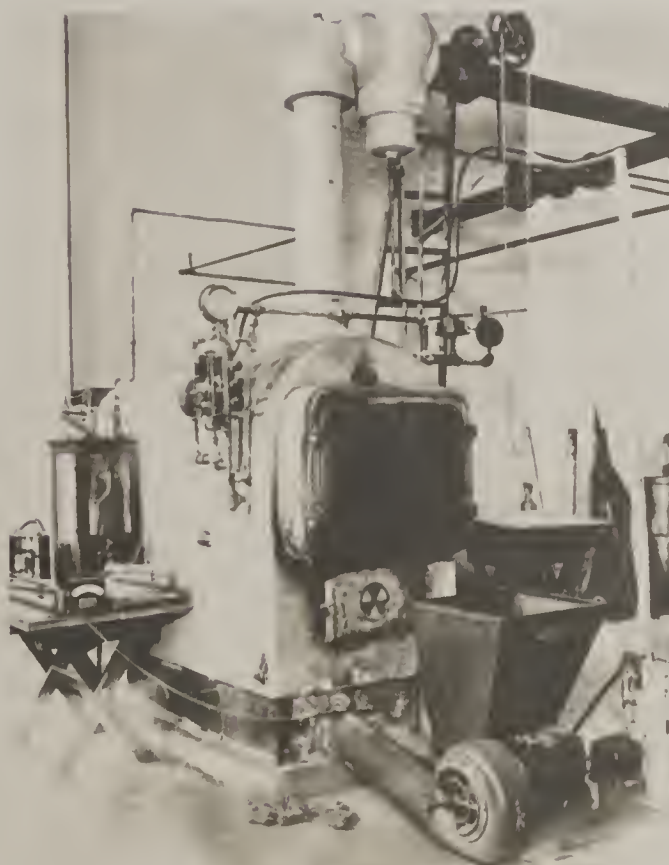
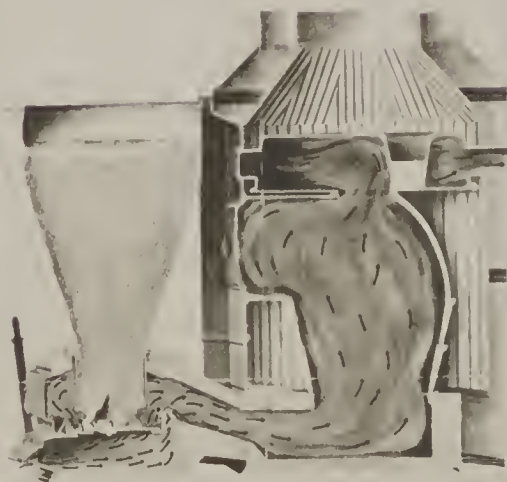
Full size wall panels tested in large testing machines at the Forest Products Laboratory (left) have shown that the rigidity and load-carrying capacity of this construction compares favorably with standard frame construction and that a system of bracing increases the strength equal to even extraordinary requirements.

The permanance of such construction is further assured by a new combined preservative and fast seasoning treatment thus far used only with laboratory equipment (right, above) but adapted to simple field equipment (right, below).



Intensive forest management in Europe has been largely because fuel wood afforded outlet for low quality material. Wood fuel has occupied a significant place under American conditions also, but fundamental changes are taking place. Much else for improving fuel wood status should be left unstudied. Three lines of recent development justify investigation for their bearing on broader usage of wood fuel: (1) radical improvement in principles of design and burning efficiency of wood stoves (Germany) and coal burning stoves (U.S.A.), (2) partially automatic feeding through the use of chips and hogged fuel (West Coast) in line with modern demand for clean, self-feeding fuel, (3) wood gas from chipped wood and charcoal as fuel for internal combustion tractor and truck engines (Europe).

Anything like general usage is out of the question -- the objective being some expansion in smaller communities fairly near the forests. A portable chipper for thinnings and slash is possible.



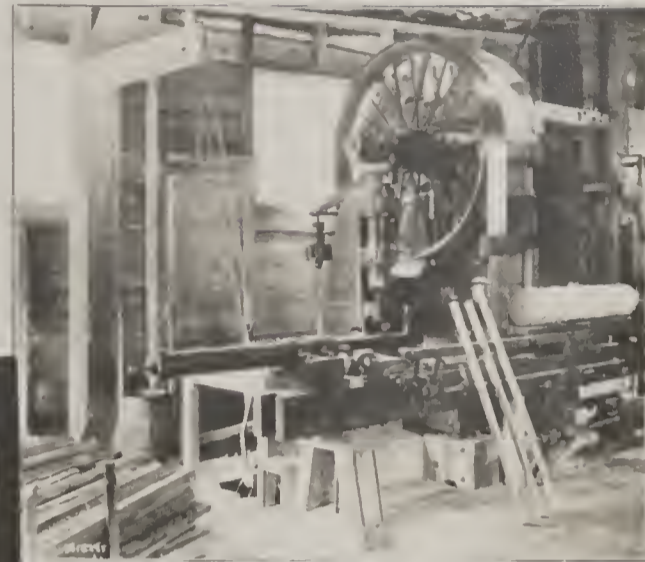
E.C.W. work at the Forest Products Laboratory has included experimentation in special laboratory test furnace (center, above) the heating efficiency, burning and feeding qualities of wood chips compared with coal with automatic stokers now sold for domestic use. Results indicate that the gravity feed type (left, above) is more promising than the worm-gear type (center).

Negotiations with a European engineering company are under way to procure a wood-gas unit (right, above) for testing on trucks and tractors, especially those used incident to forest and road work and logging and sawmilling operations.

DIMENSION STOCK AND FABRICATED PRODUCTS

Much of the material from improvement cuttings, particularly in cull hardwood stands, consists of wolf trees and crooked logs of the best species and having valuable shop cuttings in them, but not in such form as to yield lumber.

Ready-to-use stock, mill-fabricated to fixed dimensions required by the wood-using industries, put up in modern fashion, is the most promising form for utilization.



E.C.W. work at the Forest Products Laboratory in the dimension stock field has followed out the lines previously started of working out logging and milling methods, equipment, and production costs and returns applicable to this type of material with special reference recently to conditions in New England and the Tennessee Valley.



Short length flooring to meet modern use and competitive conditions is a quantity product into which much dimension stock can logically go.

E.C.W. work suggests possibilities in (1) a promising new lock-tight joint (left, above), (2) a mill-fabricated flooring panel (right, above) -- both for minimizing costs and difficulties in laying and final use, and (3) a clue as to a new type of end grain flooring panel made by punch-press methods (left, below) from small material otherwise unusable for flooring, and (4) a chemical anti-shrinkage treatment and gluing method particularly adapted to end-grain flooring.



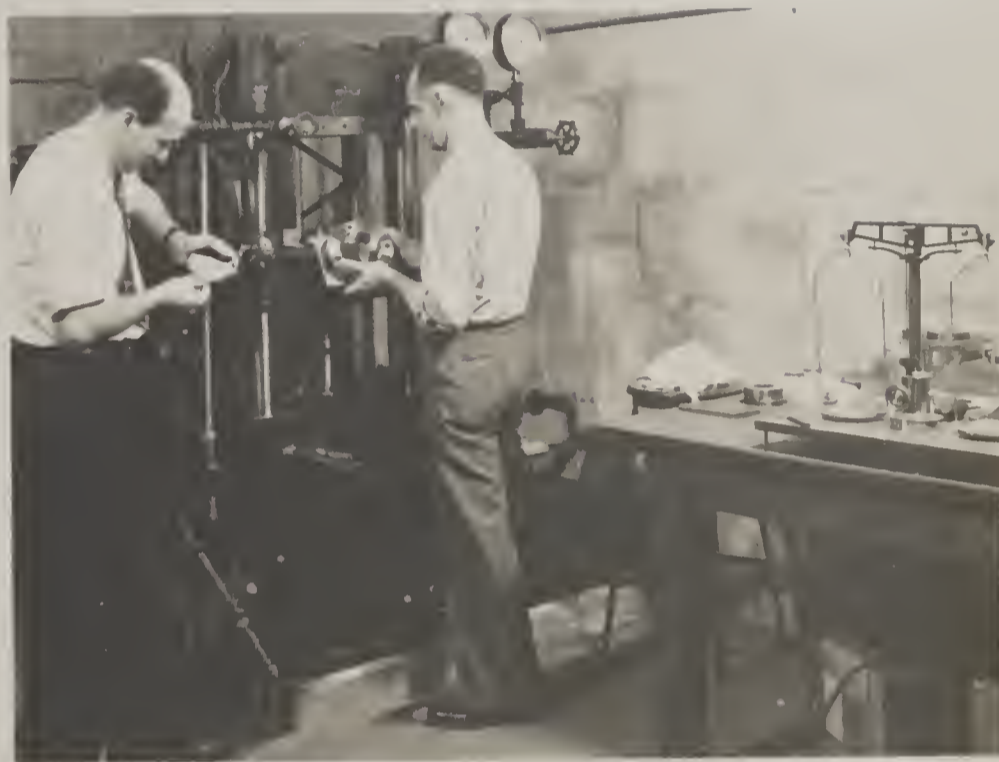
Ground-up wood, sawdust, shavings, and the like as a basis for plastic and moulding compounds entering so largely into modern manufacturing schemes is the ultimate objective of foresters as an outlet for the vast quantities of forest materials not usable for anything else.



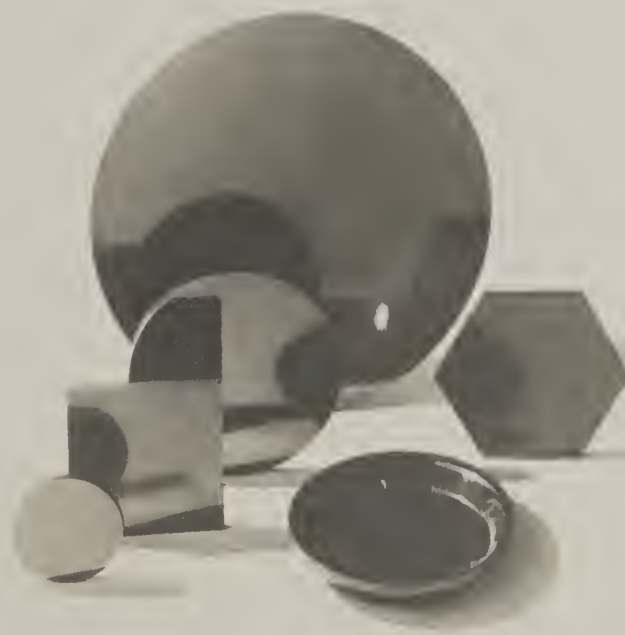
Typical Sawdust Waste



Cooking Sawdust in Laboratory Digester



Pressing Treated Sawdust into Desired Forms



General Character of Final Material,
-Adaptable to Many Forms and Products-

With the assistance of E.C.W. workers the Forest Products Laboratory has developed a process of plasticizing ground-up wood which by relatively inexpensive methods and without the addition of much material other than the wood gives promise of being adapted to a wide variety of high quality products.

PULPWOOD

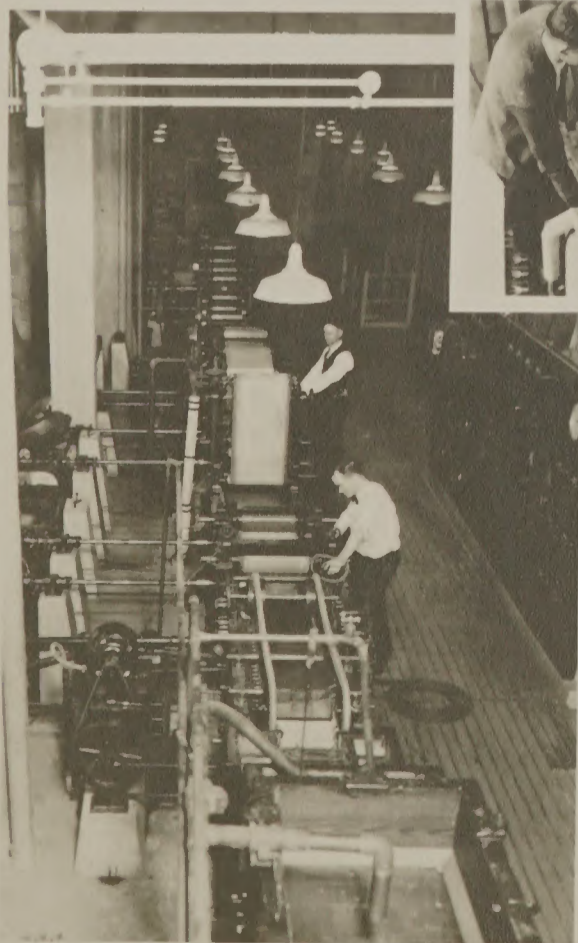
The better the prospects for pulpwood outlets the more the C.C.C. camps can do in effective stand improvement work to increase the productivity of the forests.



Fast growth, knotty material from open stands and slow growth, clear material from dense stands -- both can be used for pulp but excessive variation in any digester-charge leads to improper cooking.



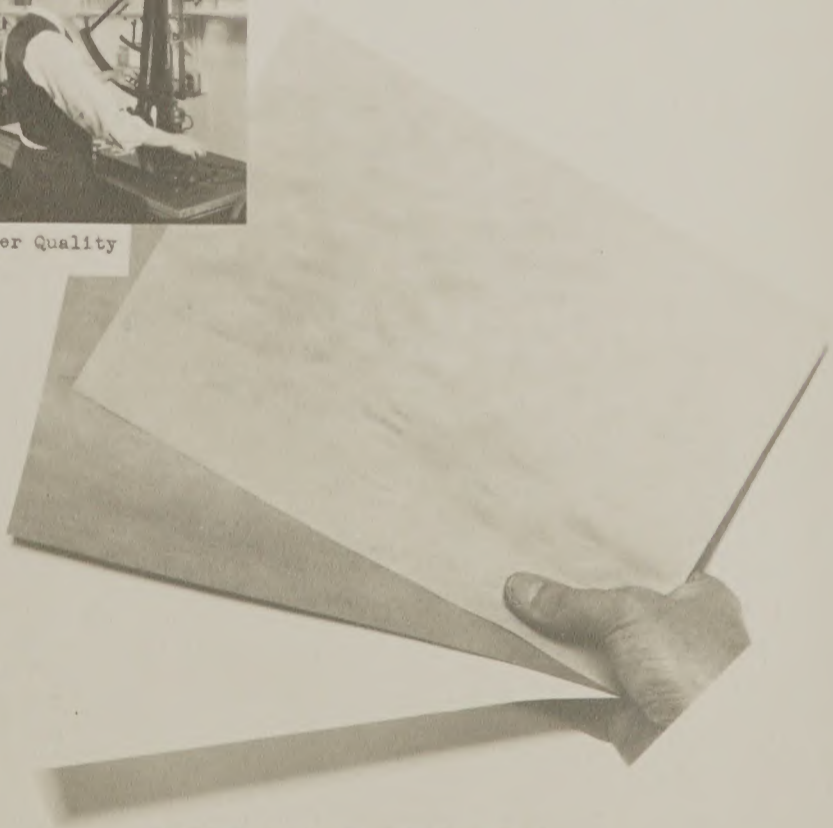
E.C.W. work under way at the Forest Products Laboratory shows that (1) according to the kind of wood available pulping processes can be modified or developed to produce commercial acceptable grades of paper, (2) the wood fiber and pulping characteristics are affected by the density of the stand as controlled by locality of growth and such cultural operations as thinning and pruning, (3) minimum size cutting limits should be adhered to from standpoint of cost; and, where woods-run material is to be used, grading according to knottiness and rate of growth is desirable for uniform and economical pulping.



Loading Digester



Testing Paper Quality



Different Qualities from Same Wood

Laboratory Paper Machine

